

IN THE CLAIMS

Please enter the following amendments to the claims:

Claim 1. (Currently amended) A method of horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, comprising:

identifying a real-world blank for machining;

establishing a coordinate system;

creating a master product and process concurrent model comprising:

a base feature;

a form feature;

said form feature exhibiting a first associative relationship with said coordinate system; having both process model and a product model characteristics. said master product and process concurrent model including a virtual blank, said master product and process concurrent model lacking an associative relationship with a coordinate system. said virtual blank corresponding to a said real-world blank;

a manufacturing feature;

virtual machining of said at least one manufacturing feature into said virtual blank; each of said at least one manufacturing feature exhibiting a second an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model an actual part; and

generating deriving manufacturing instructions from said master product and process concurrent model to create said real-world component said actual part by machining said at least one manufacturing feature into said the real-world blank;

wherein said coordinate system is substantially independent of said base feature; and

wherein said coordinate system is substantially independent of said virtual blank.

Claim 2. (Currently amended) The method of Claim 1 wherein ~~at least one of first associative relationship and said second associative relationship is a parent/child relationship.~~

Claims 3 - 8. (Cancelled)

Claim 9. (Currently amended) The method of Claim 1 further comprising creating extracts from said master product and process concurrent model.

Claim 10. (Currently amended) The method of Claim 9 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing instructions.

Claim 11. (Original) The method of Claim 9 wherein said extracts are used to generate manufacturing process sheets.

Claim 12. (Currently amended) The method of Claim 14 wherein said modeled part is based on said a base feature and said a form feature.

Claim 13. (Previously presented) The method of Claim 1 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 14. (Original) The method of Claim 13 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 15. (Currently amended) The method of Claim 1 wherein establishing said coordinate system comprises one or more datum planes.

Claim 16. (Currently amended) The method of Claim + 15 wherein said coordinate system datum planes comprises:

creating a first datum plane positioned and oriented relative to a reference;

creating a second datum plane positioned and oriented relative to said reference; and

creating a third datum plane positioned and oriented relative to said reference.

Claim 17. (Original) The method of Claim 16 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 18. (Original) The method of Claim 1 wherein said manufacturing instructions comprise process sheets.

Claims 19 and 20. (Cancelled)

Claim 21. (Original) The method of Claim 1 further comprising said master product and process concurrent model links to a process planning system.

Claim 22. (Original) The method of Claim 21 wherein said process planning system comprises automated creation of a manufacturing process plan.

Claim 23. (Currently amended) A manufactured part real-world component created by utilizing a method of horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, the method comprising:

identifying a real-world blank for machining;

creating a master product and process concurrent model having both process model and a product model characteristics, said master product and process concurrent model including a virtual blank, said master product and process concurrent model lacking an associative relationship with a coordinate system, said virtual blank corresponding to a said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system;

a product drawing of a real-world component from said master product and process concurrent model; and

deriving manufacturing instructions from said master product and process concurrent model to create said real-world component by machining said at least one manufacturing feature into the real-world blank

a blank for machining into an actual part

a coordinate system;

a master product and process concurrent model comprising:

 a base feature;

 a form feature;

 said form feature exhibiting a first associative relationship with said coordinate system;

 a virtual blank corresponding to said blank;

 a manufacturing feature virtual machined into said virtual blank;

 said manufacturing feature exhibiting a second associative relationship with said coordinate system;

 a product drawing of an actual part;

 said actual part created by machining said manufacturing feature into said blank in accordance with a manufacturing instruction;

 wherein said coordinate system is substantially independent of said base feature; and

 wherein said coordinate system is substantially independent of said virtual blank.

Claim 24. (Currently amended) The manufactured part of Claim 23, wherein at least one of said first associative relationship and said second associative relationship is a parent/child relationship.

Claims 25 - 30. (Cancelled)

Claim 31. (Original) The manufactured part of Claim 23 further comprising extracts created from said master product and process concurrent model.

Claim 32. (Currently amended) The manufactured part of Claim 31 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing instructions.

Claim 33. (Original) The manufactured part of Claim 32 wherein said extracts are used to generate manufacturing process sheets.

Claim 34. (Currently amended) The manufactured part of Claim 36 wherein said modeled part is based on said a base feature and said a form feature.

Claim 35. (Previously presented) The manufactured part of Claim 23 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 36. (Original) The manufactured part of Claim 35 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 37. (Original) The manufactured part of Claim 23 wherein said coordinate system comprises one or more datum planes.

Claim 38. (Currently amended) The manufactured part of Claim 23-37 wherein said ~~coordinate system~~ datum planes comprises:

a first datum plane positioned and oriented relative to a reference;
a second datum plane positioned and oriented relative to said reference;
and

a third datum plane positioned and oriented relative to said reference.

Claim 39. (Original) The manufactured part of Claim 38 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 40. (Original) The manufactured part of Claim 23 wherein said manufacturing instructions comprise process sheets.

Claims 41 and 42. (Cancelled)

Claim 43. (Original) The manufactured part of Claim 23 further comprising said master product and process concurrent model links to a process planning system.

Claim 44. (Original) The manufactured part of Claim 43 wherein said process planning system comprises automated creation of a manufacturing process plan.

Claim 45. (Currently amended) A storage medium encoded with a machine-readable computer program code for horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, said storage medium including instructions for causing a computer to implement a method comprising:

identifying a real-world blank for machining;

establishing a coordinate system;

creating a master product and process concurrent model comprising:

a base feature;

a form feature;

said form feature exhibiting a first associative relationship with said coordinate system; having both process model and a product model characteristics, said master product and process concurrent model including a virtual blank, said master product and process concurrent model lacking an associative relationship with a coordinate system, said virtual blank corresponding to a said real-world blank;

a manufacturing feature;

virtual machining of said at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting a second an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model as an actual part, and

generating deriving manufacturing instructions from said master product and process concurrent model to create said real-world component said actual part by machining said at least one manufacturing feature into said the real-world blank;
wherein said coordinate system is substantially independent of said base feature; and
wherein said coordinate system is substantially independent of said virtual blank.

Claim 46. (Currently amended) The storage medium of Claim 45 wherein at least one of first associative relationship and said second associative relationship is a parent/child relationship.

Claims 47 - 52. (Cancelled)

Claim 53. (Original) The storage medium of Claim 45 further comprising creating extracts from said master product and process concurrent model.

Claim 54. (Currently amended) The storage medium of Claim 53 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing instructions.

Claim 55. (Original) The storage medium of Claim 53 wherein said extracts are used to generate manufacturing process sheets.

Claim 56. (Currently amended) The storage medium of Claim 58 wherein said modeled part is based on said a base feature and said a form feature.

Claim 57. (Previously presented) The storage medium of Claim 45 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 58. (Original) The storage medium of Claim 57 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 59. (Original) The storage medium of Claim 45 wherein establishing said coordinate system comprises one or more datum planes.

Claim 60. (Currently amended) The storage medium of Claim 45 59 wherein said coordinate system datum planes comprises:

creating a first datum plane positioned and oriented relative to a reference;

creating a second datum plane positioned and oriented relative to said reference; and

creating a third datum plane positioned and oriented relative to said reference.

Claim 61. (Original) The storage medium of Claim 60 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 62. (Original) The storage medium of Claim 45 wherein said manufacturing instructions comprise process sheets.

Claims 63 and 64. (Cancelled)

Claim 65. (Original) The storage medium of Claim 45 further comprising said master product and process model links to a process planning system.

Claim 66. (Original) The storage medium of Claim 65 wherein said process planning system comprises automated creation of a manufacturing process plan.

Claim 67. (Currently amended) A computer data signal propagated over a transmission medium for communicating with a computer, said signal including code configured to cause a computer to implement a method embodied in a computer readable form, for horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, said computer data signal comprising code configured to cause a processor to implement a the method comprising:

identifying a real-world blank for machining;

establishing a coordinate system;

creating a master product and process concurrent model comprising:

a base feature;

a form feature;

~~said form feature exhibiting a first associative relationship with said coordinate system; having both process model and a product model characteristics.~~ said master product and process concurrent model including a virtual blank, ~~said master product and process concurrent model lacking an associative relationship with a coordinate system.~~ said virtual blank corresponding to a said real-world blank;

a manufacturing feature;

virtual machining of ~~said at least one~~ manufacturing feature into said virtual blank, ~~each of said at least one~~ manufacturing feature exhibiting a ~~second~~ an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model an actual part; and

generating deriving manufacturing instructions from said master product and process concurrent model to create said real-world component said actual part by machining ~~said at least one~~ manufacturing feature into said the real-world blank;

wherein said coordinate system is substantially independent of said base feature; and

wherein said coordinate system is substantially independent of said virtual blank.

Claim 68. (Currently amended) The computer data signal of Claim 67 wherein ~~at least one of first associative relationship and said second associative relationship is a parent/child relationship.~~

Claims 69 - 74. (Cancelled)

Claim 75. (Original) The computer data signal of Claim 67 further comprising creating extracts from said master product and process concurrent model.

Claim 76. (Original) The computer data signal of Claim 75 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing.

Claim 77. (Original) The computer data signal of Claim 75 wherein said extracts are used to generate manufacturing process sheets.

Claim 78. (Currently amended) The computer data signal of Claim 80 wherein said modeled part is based on said a base feature and said a form feature.

Claim 79. (Previously presented) The computer data signal of Claim 67 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 80. (Original) The computer data signal of Claim 79 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 81. (Currently amended) The computer data signal of Claim 67 wherein establishing said coordinate system comprises one or more datum planes.

Claim 82. (Currently amended) The computer data signal of Claim 67 81 wherein said coordinate system datum planes comprises:

creating a first datum plane positioned and oriented relative to a reference;
creating a second datum plane positioned and oriented relative to said reference; and

creating a third datum plane positioned and oriented relative to said reference.

Claim 83. (Original) The computer data signal of Claim 82 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 84. (Original) The computer data signal of Claim 67 wherein said manufacturing instructions comprise process sheets.

Claims 85 and 86. (Cancelled)

Claim 87. (Original) The computer data signal of Claim 67 further comprising said master product and process concurrent model links to a process planning system.

Claim 88. (Original) The computer data signal of Claim 87 wherein said process planning system comprises automated creation of a manufacturing process plan.